TRENDS IN THE QUALITY AND UNIFORMITY OF ASSESSING IN NEW YORK STATE: 1986 RESULTS

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May 1990

Publication 1268 (9/11)

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EXECUTIVE SUMMARY

The fairness, or equity, of the real property tax centers on whether equally valued properties are taxed equally. To achieve fairness, section 305 of the Real Property Tax Law prescribes that "all real property in each assessing unit shall be assessed at a uniform percentage of value." This report summarizes, at the state and county level, the amount of assessment uniformity found within New York State's 994 assessing units (excluding villages), using two concepts of assessment performance:

1. **Horizontal Assessment Equity:** This is the degree to which a municipality's assessed-to-market value ratios cluster around the median assessment ratio. It is used to discover whether assessment uniformity occurs among properties of similar value, and is measured by the coefficient of dispersion (COD).

2. **Vertical Assessment Equity:** This is used to ascertain whether assessment practices are similar for both higher- and lower-valued real property. It is measured by the index of regressivity.

These measures of assessment uniformity are calculated both for residential property only and for all property classes combined.

Due to the time needed to conduct market surveys, our data are not current with many local governments' recent efforts to maintain and improve their assessment rolls. For example, about 50% of all cities and towns have had significant changes in assessment levels since the 1986 market value survey. Such municipalities are to be commended for their efforts to maintain accurate assessments on their rolls and may indeed have acceptable assessing practices because of these efforts. In particular, those cities and towns with already good

assessment rolls are to be commended for striving to make them even more uniform.

However, while the lag in the market survey data used in the current study is unavoidable, it may be misleading to state the amount of assessment error which was occurring in a given assessing unit as much as seven years ago. The report, therefore, differs from previous ones issued by the State Board of Equalization and Assessment (SBEA) in that it presents state and county level summary statistics only. This policy was adopted to prevent dissemination of information relative to specific assessing units which improved their assessing practices since the 1986 survey and for which the data in the current study would be an unfair measure of more recent performance.

The basis of the study is a comparison of the appraised values of parcels sampled in the 1986 market value survey to the assessed values taken from the assessment rolls used in this survey (1983 rolls for most municipalities). The median assessment ratio in each assessing unit, weighted to have each sampled parcel counted as many times as the number of parcels it represents, is used as the basic comparison standard. The coefficient of dispersion is the average percent deviation of each parcel from this median ratio, and as the size of this statistic approaches zero, there is less disparity (greater equity) in the tax bills of comparable properties. Higher levels of equity are generally found in areas where assessed values are close to market values. The higher the measured coefficient of dispersion, representing greater divergence from the median ratio, the lower the level of assessment uniformity and the greater the inequality in tax liability.

SBEA has set minimum standards of uniformity which are used in this report as a benchmark in evaluating the performance of assessing units. These standards are a coefficient of dispersion of 10% or less for residential properties and 15% or less for all property classes combined. Among the 994 cities and towns of New York State for which assessments were analyzed, only 72 (7.2%) met the residential standard and only 94 (9.4%) made the all property standard of uniformity. The "worst cases" of assessing practices uncovered in the study were the 17 locations with residential COD's of more than 50% and the 101 cities and towns with all property coefficients above 50%.

More than three-quarters of the small group of high-achievement assessing units exhibited overall market value ratios of over 70%, indicating that tax equity goes hand-in-hand with full value assessing. The magnitude of this evident relationship between the level of equity achieved and the level of assessment was estimated by means of regression equations. A low coefficient of dispersion was used as the indicator of good performance, and a high median assessment ratio indicated a commitment to full value assessing. The following table shows the predictive implications of the estimation—the expected relationship between a municipality's median assessed value ratio and its expected level of assessment error, as measured by the coefficient of dispersion. For both the residential and all property categories, a clear association between the level of assessment and assessment uniformity is predicted; in general, those assessing units which are at or approaching the full value standard are the ones which are likely to have the fairest assessments.

Observed Median AV Ratio	Expected Coefficient of Dispersion		
	Residential		All Property
10%	25.58		39.70
20%	24.04		35.60
30%	22.50		33.01
40%	20.96	poor	30.13
50%	19.42		27.25
60%	17.88		24.37
70%	16.34		21.48
80%	14.80	fair	18.60
90%	13.26		15.73
100%	11.72		12.85
110%	10.18	good	9.97
120%	8.64		7.09

There are increased complexities in estimating the value of property types other than residential property, and this causes assessing difficulties for such categories. In some municipalities, there is a noticable trend toward over-assessment of one or more non-residential property classes. For this reason, the coefficient of dispersion for all property types combined is generally higher than that for the residential category alone. This dichotomy is evident in both the results presented above and in the higher COD (15%) SBEA deems acceptable for the all property category.

Two statewide assessment error measures have been computed, a municipal-weighted COD (median municipality) and a parcel-weighted COD (median parcel), for both the residential and the all property classes. These statistics, listed in the table below, have reasonably similar values in the case of residential property. The higher median parcel-weighted measure of error for the all property category (30.4% vs 28.6% for the municipal-weighted category) indicates that the largest municipalities are treating classes of property other

than residential more inequitably than their smaller neighbors. The roughly ten percentage point difference between the statewide residential and all property error measures (19.6% versus 28.6% and 19.5% versus 30.4%) again points out the greater difficulty and inequity which is typically involved in assessing property classes other than residential.

Property Type	SBEA Standard	1986 Survey Statewide Averages: Coefficient of Dispersion	
		Municipal Weighting(1)	Parcel Weighting(2)
Residential Only	10.0%	19.6%	19.5%
All Property	15.0%	28.6%	30.4%

(1) Statewide median COD (between the 497th and 498th of 994 assessing units).
(2) Statewide median COD weighted by number of parcels per assessing unit.

The 1986 survey results were also compared with those derived from the earlier 1980 and 1983 SBEA market surveys. The number of low residential and all property CODs increased between the 1980 and 1983 surveys. The number of municipalities having residential coefficients of 20% or less also increased by 87 between the two surveys, and the number with all property class coefficients at or below 20% increased by 61. However, the current findings relative to the 1986 survey indicate that much of these gains have been lost. Between the 1983 and 1986 surveys, the number of municipalities with residential coefficients of dispersion below 20% declined by 58, and there were 57 fewer municipalities with all property coefficients below 20%.

The second measure of assessment equity studied in this report tests for "vertical assessment bias". At issue here is the question of whether higher valued properties are over- or under-assessed relative to lower valued properties in the same assessing unit. The "index of regressivity" (sometimes referred to as the "price-related differential") measures the extent to which this phenomenon exists on an assessment roll. It is computed as the mean assessment ratio divided by the "weighted" mean assessment ratio, where the weighting factor is the dollar value of each parcel. The properties of this index are such that values above 1.10 indicate regressive assessment practices, or high valued properties being systematically under-assessed, while low valued properties are over-assessed. Values below 0.95 reveal progressive practices, which involve systematic over-assessment of high-worth properties and underassessment of low-worth properties. Neutral assessing practices mean the absence of either type of bias.

The table which follows reveals primarily neutral practices in 85% of the municipalities for residential assessing, although about 13% have tendencies toward regressive assessment practices and only 2% demonstrate a tendency toward progressivity. When all property classes are combined, the number with neutral assessing practices falls by more than half, with about the same number of municipalities demonstrating a regressive pattern. The lower incidence of neutrality is due to a much higher incidence of progressivity under the all property measure; 449 cities and towns, or 45%, are inclined toward over-assessing higher valued properties. This points out the tendency in many assessing units toward over assessment of high valued non-residential property.

Vertical Assessment Equity by County and by Assessing Unit

	Number of Assessing Units Exhibiting Vertical Equity					
	Progressive		Neutral		Regressive	
Property Type	County Averages	No. of Assessing Units	County Averages	No. of Assessing Units	County Averages	No. of Assessing Units
Residential	0	20	57	842	1	132
All Property	30	449	27	411	1	134

In summary, significant statewide directions in assessment practices, as uncovered in this study of assessment roll uniformity, include the following:

- assessment rolls more closely approximating full value are more likely to attain greater uniformity.
- greater uniformity is expected and attained in assessing residential properties as compared to other property classes.
- of the 994 cities and towns in New York State, approximately one assessing unit in fourteen achieved the standard of assessment uniformity set by SBEA, based on 1986 survey data; (however, almost half have recorded significant changes in assessment practices planned or completed since the 1986 survey base year roll and more may now meet the standard.) The 1986 results represent a decline in measured uniformity compared with 1983 survey results, where one in eight achieved the state's uniformity standards. However, only two of nine were then recording a significant updating of their assessment practices.
- within the all property category, higher-valued properties tend to be assessed at higher percentages of value than lower-valued properties (progressive practices) in about 45% of New York's assessing units, 41% are neutral, and 13% over assess lower-valued properties.
- in the residential class, higher-valued properties tend to be assessed at lower percentages of value than lower-valued properties (regressive practices) in about 13% of assessing units. In 85%, assessing practices do not display a bias in either direction, and only 2% over-assess higher valued residences (progressive practices).

TRENDS IN THE QUALITY AND UNIFORMITY OF ASSESSING IN NEW YORK STATE: 1986 RESULTS

The analysis contained in this report is in keeping with the efforts of the New York State Division of Equalization and Assessment (SDEA) to encourage quality of assessing of real property for the purpose of ensuring equitable tax treatment for all New York State real property owners. The fairness, or equity of the real property tax centers on whether like properties are treated alike. Section 305 of the Real Property Tax Law, enacted in 1981, prescribes that "all real property in each assessing unit shall be assessed at a uniform percentage of value." Each assessing unit retains the ability to choose the percentage of value to be used as an assessment standard and, while the percentages used have typically not been made public, legislation is pending which would mandate that each assessing unit should declare the percentage which it has chosen (Governor's Program Bill #183 and Senate 6894). This report measures the extent to which uniformity actually occurs. In a city or town, two fully taxable residences worth the same amount should have identical assessments and pay equivalent amounts in real property taxes within a taxing jurisdiction.

Taxation according to the value of real property implies determining the market value of each parcel. Within bounds, the attempt to attach values to real property is an inexact science, but the assessor nevertheless must estimate the value. Assessment rolls contain assessments based upon such estimates of property values, with the basis for the estimates derived from recent sales, from the cost of replacing property improvements, or from the amount of rental income generated from income-producing properties. While the real estate market is generally conceded to be the most accurate predictor of property values, even recent sales data must be viewed with some caution. Different

effects occur in the market over time, between neighborhoods, and across different means of financing sales. These differences need to be identified and analyzed in order to apply the sales correctly in ascertaining value.

In 1987, the real property tax in New York State produced close to fifteen billion dollars in support of schools, local governments, and special districts. For a variety of State and local purposes, including the distribution of an additional eight billion dollars in aid to education, the New York State Board of Equalization and Assessment (SBEA) conducts a periodic market value survey of property values in the State's assessing units. The survey results are used to establish the average percentages of value reflected on the assessment rolls of all assessing units. This report uses the appraisals of real property value obtained in the 1986 market value survey to perform an additional function: the measurement of assessment uniformity.

The report analyzes the extent of uniformity with the aid of two measures of assessment performance for two sets of real property in each of the municipalities listed. The measures of assessment performance are:

1. The coefficient of dispersion (COD) is a measure of the amount of dispersion away from the median assessed-to-market value ratio. It is calculated to discover whether properties of comparable market value are assessed equally within a municipality. A high coefficient of dispersion indicates a wide spread of assessed values is occurring on an assessment roll among properties of comparable worth. This is an indication of uneven taxation within a municipality across equal-valued properties (horizontal inequity). An average residential assessment error of 10% and a 15% error for all property classes combined is the maximum acceptable error.

2. The index of regressivity is a measure of whether assessments of higher valued properties occur at a similar fraction of market value as assessments of lower valued properties (vertical equity). A value close to 1.00 (between .95 and 1.10) indicates vertical equity.

The property classifications which are separately identified in calculating these measures for each assessing unit are:

1. **Residential Property:** one, two, and three family residences (Class A) within an assessing unit are measured for uniformity and regressivity.

2. **All Property:** four property classes within an assessing unit, including residential property, are combined and measured. The other three classes (for all counties except special assessing units) consist of these property types: commercial, apartment and industrial property (Class B); vacant, farm and forest parcels (Class C); and utility property (Class D).

Reassessment and Updates

This study is essentially a "point-in-time" analysis of the assessing practices in effect when the 1986 market value survey was conducted. For 949 of New York State's 994 cities and towns, this survey used a sample of real properties taken from the 1983 assessment rolls, to be appraised at a July, 1986 estimated market value. Of the remaining municipalities, which had undergone substantive changes between their 1983 and 1986 rolls, 41 had samples taken from 1984 rolls, two from 1985 and two from 1986 rolls. Because the assessment data available for these surveyed properties are tied to the rolls for the years in question, the analysis in this report is basically a study of assessment practices in the year of the roll from which sample properties were selected.

However, almost half of the 994 assessing units have substantially changed their assessment rolls since the date of the roll used in the survey. Appendix A lists the cities and towns which have initiated or completed revaluations since the year of their assessment roll which was used to conduct the 1986 market value survey or have had a change in level of 15% or more in any year. In total, more than 400 revaluations or updates have been logged by local governments with SDEA (either planned or completed). Almost 60 assessing units not

revaluing with the aid of SDEA have had a change in their assessment level of 15% or greater in any one year subsequent to the roll used for the 1986 survey, indicating the probable existence of reassessment activity conducted independently by local governments.

Since the findings of this report pertain to assessment practices in the 1983-86 period rather than the current year, only general statistical results will be presented. Despite past attempts to include sufficient warnings that the study reviews prior data, there is always a tendency to assume it reflects the current situation in an assessing unit. Thus, results for individual assessing units could, if published, be used to depict incorrectly the quality of assessing for a city or town which has made an effort to update and/or significantly improve its assessment roll since the 1986 survey data was collected. Publication of statewide results which are compared, where possible, with the findings taken from former market value surveys (1980 and 1983) concerning assessment equity, facilitate an overall analysis of assessment uniformity without jeopardizing the efforts of the units undergoing major assessment improvements. Because of the effort and energy expended by these local governments, it is entirely possible that many now have assessment rolls meeting recommended standards. Most deserving of praise and recognition are those which have continually produced good assessment rolls and which have made a continued effort to retain their uniformity and fair treatment of their citizens.

Market Survey Data

In the 1986 market value survey, the number of sampled parcels in an assessing unit varied, primarily due to the number and complexity of parcels on the roll. In general, the larger the number of parcels or the larger the number of

equalization rates required (e.g., for incorporated villages within towns), the larger the number of appraisals conducted. Approximately 76,000 parcels were selected from local assessment rolls to be appraised for the 1986 survey.

In general, the rules for selecting the appraisals in the survey involved a stratified random sample. Within each municipality or portion thereof, the roll was first segregated into property classes. Within some of the property classes (e.g., residential) assessed value intervals were then constructed as a second dimension of stratification. Finally, within the value intervals, randomly selected parcels were appraised.

The procedures involved in the selection of sampled parcels were designed to produce the most cost-effective estimation of municipal market value. With almost one thousand assessing units and about five million parcels to be sampled, and limited staff resources to complete the survey, the trade-off between sample size and timeliness had to be recognized. Thus, an "efficiency norm," built into the process, determines optimal sample size by lowering the sampling error per unit cost of obtaining the appraisals.

Complicating the process is the disproportionate nature of sampling within assessing jurisdictions. The size of the sample does not depend solely on the size of the population. For example, sample size could be increased if there is an unacceptably high measure of sampling error detected. The sampling procedures thus have limitations to the extent that they were designed for the generation of equalization rates, rather than for the generation of coefficients of dispersion.

In contrast to the approach taken in the present study, most of the coefficients of dispersion calculated in the United States, including those done by the Bureau of the Census, reflect a comparison of actual sales to assessments in measuring assessment roll uniformity. There are a considerable number of

problems using sales as reported in New York State, however. Experience has shown that the data produced by the state's reporting system is likely to be flawed for several reasons: the original reports are being filled out by disinterested parties who have no stake in the accuracy and completeness of the data or any interest in the uses of the sales reports; verification of the conditions of sales by assessment officials is insufficient in many assessing units and difficult to accomplish when it is attempted; the number of sales in some of the smaller jurisdictions is insufficient to produce dispersion measures; sales may not be representative of assessment rolls due to some categories of real property being infrequently sold; financing, especially seller assistance, can distort selling prices in some cases; and the time variation represented in the sales data requires adjustments to keep up with the changes in the real estate market. For these reasons, the appraisal base used to generate equalization rates is considered the best available data in generating measures of assessing unit performance.

Even so, some problems remain in the use of these market value survey data for coefficient of dispersion studies. The following limitations have been identified:

- samples are drawn from intervals composed of equal assessed values within a property class, rather than from intervals with equal numbers of parcels;
- multiple property classes produce different probabilities of being selected for each parcel sampled and appraised;
- different sized portions within assessing units produce different probabilities of being selected within the sampling procedure;
- the stratified random sampling method which maximizes the efficiency of samples for equalization rate purposes may distort the computation of coefficients of dispersion;
- review procedures built into the rate-making process may allow reviewers to artificially produce less variation around a measure of central tendency by challenging only appraisals with abnormally high or low assessment ratios; and
- most real property values within a property class have an uneven distribution.

Experience has shown that the sum of these qualifications to the use of the appraisal-based measures of assessment uniformity will not produce the distortions which occur in using sales reports. Even though the overriding theme of the market value surveys is to produce equalization rates, it is possible to make appropriate statistical adjustments which offset some of the difficulties listed above. These adjustments (see Appendix B) involve a reweighting of the sampled parcels and greatly facilitate the use of survey appraisal data in evaluating assessment uniformity.

Coefficients of Dispersion

The primary measure of assessment uniformity is the coefficient of dispersion; this statistic has been called the "single most useful measure of assessment variability" by the International Association of Assessing Officers. It can only be used to compare assessment error across assessing units. It expresses the average assessment error within a municipality, but this does not determine how the error is spread among individual parcels in the municipality.

The coefficient of dispersion measures the closeness of observed assessment ratios on a roll to the middle, or median, assessment ratio. A lower coefficient indicates more uniform assessing practices, while higher coefficients depict more assessment error. If all properties are assessed at the same fraction of value, the coefficient of dispersion will be zero. If real property assessments are arbitrarily made or poorly maintained over time, this will be reflected by a high coefficient of dispersion. For residential properties, the State Board of Equalization and Assessment has defined an acceptable coefficient of dispersion as 10% or less. For all classes of real property the standard is 15% or less.

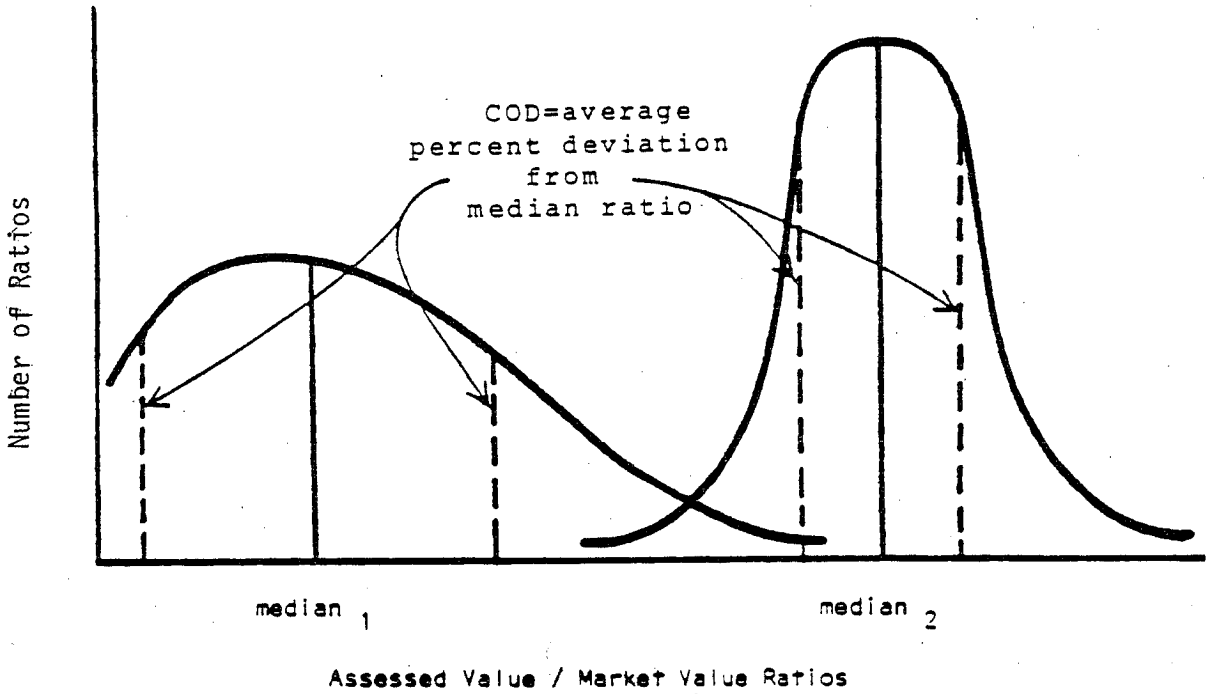
Consider a municipality which is assessing at full value. The 10% figure for residential properties says that half of the deviation for residences worth

$100,000 falls on those assessed at between $90,000 and $110,000. The other half of the deviation falls on $100,000 residences assessed below $90,000 or above $110,000. These properties carry the greater share of inequitable taxation. For similar municipalities with a coefficient of dispersion of 30 percent, half of the error on $100,000 properties would be for parcels incorrectly assessed at between $70,000 and $130,000. The remaining half of the deviation for $100,000 residences would fall upon those parcels erroneously assessed at values less than $70,000 or greater than $130,000, resulting in excessively inequitable tax burdens.

Figure 1, containing two distributions of assessment ratios, illustrates how a coefficient of dispersion works. In the first distribution, assessment ratios for sampled properties are distributed around the median so that greater "dispersion" is evident. This amount of difference from the median assessment ratio will result in a higher coefficient of dispersion -- a wider percentage spread in both the plus and minus directions. In the second case, assessment ratios are much closer to the median ratio. This will result in a much lower coefficient of dispersion, where the average percentage deviation from the median is small.

In essence, the calculation of a coefficient of dispersion for an assessing unit requires knowledge of only the following data: (1) the assessed values of a sample of properties; (2) the market values of the same properties; and (3) the relationship between the number of properties in the sample and the number in the population. The first step involves calculating an assessment ratio for each sample property by dividing the assessed value by the market value obtained from the market value survey. The assessment ratios are then weighted (counted as many times as the total number of parcels each sample parcel represents). The next step is to list the ratios from lowest to highest in order to identify the middle ratio (median), which is used as the comparison standard.

Figure 1. Illustration of Coefficient of Dispersion Resulting From Different Distributions of Assessment Ratios: Two Hypothetical Places



The difference (dispersion) of each parcel's assessment ratio from the median is then calculated, disregarding whether it is higher or lower than the median. These absolute differences are then summed and divided by the total number of parcels to obtain the average deviation from the median ratio. This average difference is divided by the median ratio itself to determine the average percent difference, which is the coefficient of dispersion. The coefficient of dispersion expresses what an equal percent share of the total deviation from the median would be if it were spread evenly among the parcels. (See Appendix B for further explanation of calculations and weighting of parcels.)

To show how coefficients of dispersion work, consider two hypothetical municipalities, represented in the following examples, with five properties in each. In Example 1, the municipality has a COD of 30%, and the assessment ratios vary between 52% of market value and 120% of market value. In Example 2, the coefficient is 10%, and the ratios vary less dramatically — from 64% to 92% of market value. The median ratio for each of these two municipalities is the same, 80%. The wider spread from the median ratio in Example 1 produces a higher average difference from the standard, or median, ratio than is the case in Example 2. Assessment practices for properties in the first municipality are less uniform than in the second, producing greater inequities in taxation.

Example 1: Coefficient of Dispersion of 30%.

Municipality 1	Assessed Value	Market Value	AV/MV Ratio	Absolute Difference from Median
1.	$120,000	$100,000	1.20	.40
2.	110,000	100,000	1.10	.30
3. Median	80,000	100,000	.80	.00
4.	58,000	100,000	.58	.22
5.	52,000	100,000	.52	.28
			Total Difference	1.20

$$\frac{\text{Total Difference}}{\text{No. Parcels}} = \frac{1.20}{5} = .24 \text{ average deviation from median}$$

$$\text{COD} = \frac{\text{Avg. Deviation}}{\text{Median Ratio}} = \frac{.24}{.80} = 30 \text{ percent}$$

Example 2: Coefficient of Dispersion of 10%.

Municipality 2	Assessed Value	Market Value	AV/MV Ratio	Absolute Difference from Median
1.	$ 92,000	$100,000	.92	.12
2.	88,000	100,000	.88	.08
3. Median	80,000	100,000	.80	.00
4.	76,000	100,000	.76	.04
5.	64,000	100,000	.64	.16
			Total Difference	.40

$$\frac{\text{Total Difference}}{\text{No. Parcels}} = \frac{.40}{5} = .08 \text{ average deviation from median}$$

$$\text{COD} = \frac{\text{Avg. Deviation}}{\text{Median Ratio}} = \frac{.08}{.80} = 10 \text{ percent}$$

Coefficients of Dispersion: 1986 Survey

The amount of assessment irregularity found in municipalities in New York State varies widely. The average coefficient of dispersion for residential property in the state's 994 municipalities, as calculated from 1986 survey information, was 19.6%. This represents a significant increase from the 18.3% average registered for the 756 municipalities reported in the 1983 survey report. The statewide average COD for "all property" was 28.6% based on the 1986 survey data — up from 27.4% in the 1983 survey. Both statewide error factors are substantially in excess of the SBEA acceptability standard of 10% for residential property and 15% for all property classes combined. Even more worrisome is the trend toward higher CODs, indicating growing statewide non-uniformity in assessing practices. These general findings, discussed below in greater detail, indicate that substantial efforts are still required if New York's property taxpayers are to be treated fairly and uniformly.

Residential Coefficients of Dispersion

Of the 994 assessing units studied using 1986 survey information, only 72 (about 7.2%) met the SBEA residential assessment error limit of 10% or less. Overall, CODs were distributed according to the pattern in Table 1. The great majority of assessing units, about 76%, had CODs which fell in the 10% to 30% range, and a small minority had CODs exceeding 40%.

Table 1. Residential Coefficients of Dispersion, 1986 Survey.

Coefficient of Dispersion Range	Number of Municipalities	Percent
10% or less	72	7.2
10% to 20%	441	44.4
20% to 30%	317	31.9
30% to 40%	114	11.5
40% to 50%	33	3.3
50% or more	17	1.7

Fourteen counties are distinguished by having two or more municipalities with exceptionally low residential assessment error (10% or less). Niagara led the counties with twelve of its assessing units having a rate of residential error of 10% or less. Genesee County had six municipalities with low CODs; Cortland and Monroe Counties each contained five; Livingston, Steuben and Wyoming Counties, four; Ontario and Saratoga Counties, three; and the counties of Erie, Orange, Orleans, Rensselaer and Schenectady each had two. It is important to point out that all the cities and towns in Niagara and Genessee Counties have updated their assessment rolls since 1986. Clearly, these two counties are the assessment quality leaders in New York.

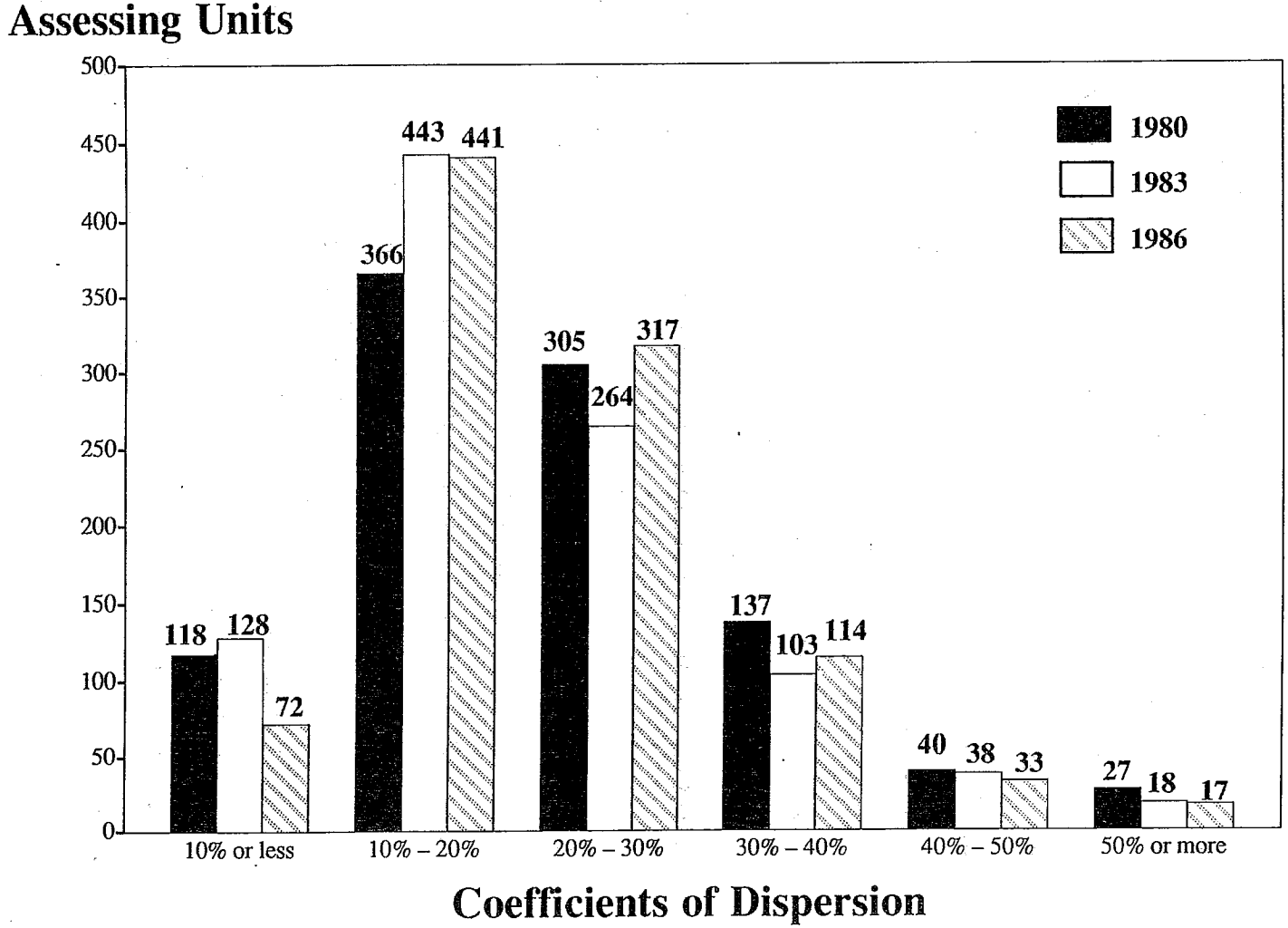
Seventeen assessing units had an average deviation from the median of more than plus or minus 50%. At plus or minus 50%, the $100,000 house used in an earlier example would have an average assessment error of $50,000. With a tax rate of 3%, the average tax bill on a $100,000 property is either $1,500 or $4,500 instead of the appropriate $3,000, depending upon whether an under-assessment or over-assessment has occurred.

It is worth noting that more than three-fourths (54 of 72) of the assessing units with exemplary assessment practices for residential properties (CODs of 10% or less) had median ratios of over 70%. While 652 of New York's assessing units had median ratios of 50% or less, only 10 places in this group made the list of the top 72 assessing units. The seventeen places with residential coefficients of dispersion greater than 50% all had median ratios of less than 50% (with 14 of these ratios at 10% or lower).

Figure 2 shows the distribution of all cities and towns according to the magnitude of their residential coefficients of dispersion. Included is a comparison of residential CODs which are based on the results from the 1980, 1983 and 1986 market value surveys. The data based on the 1983 survey show ten more places with residential CODs of less than 10% and 77 more municipalities with coefficients between 10% and 20% since the 1980 survey.

A dramatic slippage in uniformity is reflected in the 1986 results, with 56 more localities' coefficients rising above 10% since the 1983 survey. This is a 44% decline in places meeting the SBEA standard. Among the 994 cities and towns, the 1986 survey median residential COD was 19.6% — up 1.7 percentage points from the 17.9% median calculated from all municipalities in the 1983 market value survey. The number of places exhibiting equitable residential assessing practices thus falls far below desirable levels and the overall level of residential uniformity is declining.

Figure 2: Distribution of Coefficients of Dispersion, Residential Property Only 1980, 1983, and 1986 Surveys



994 New York State Assessing Units

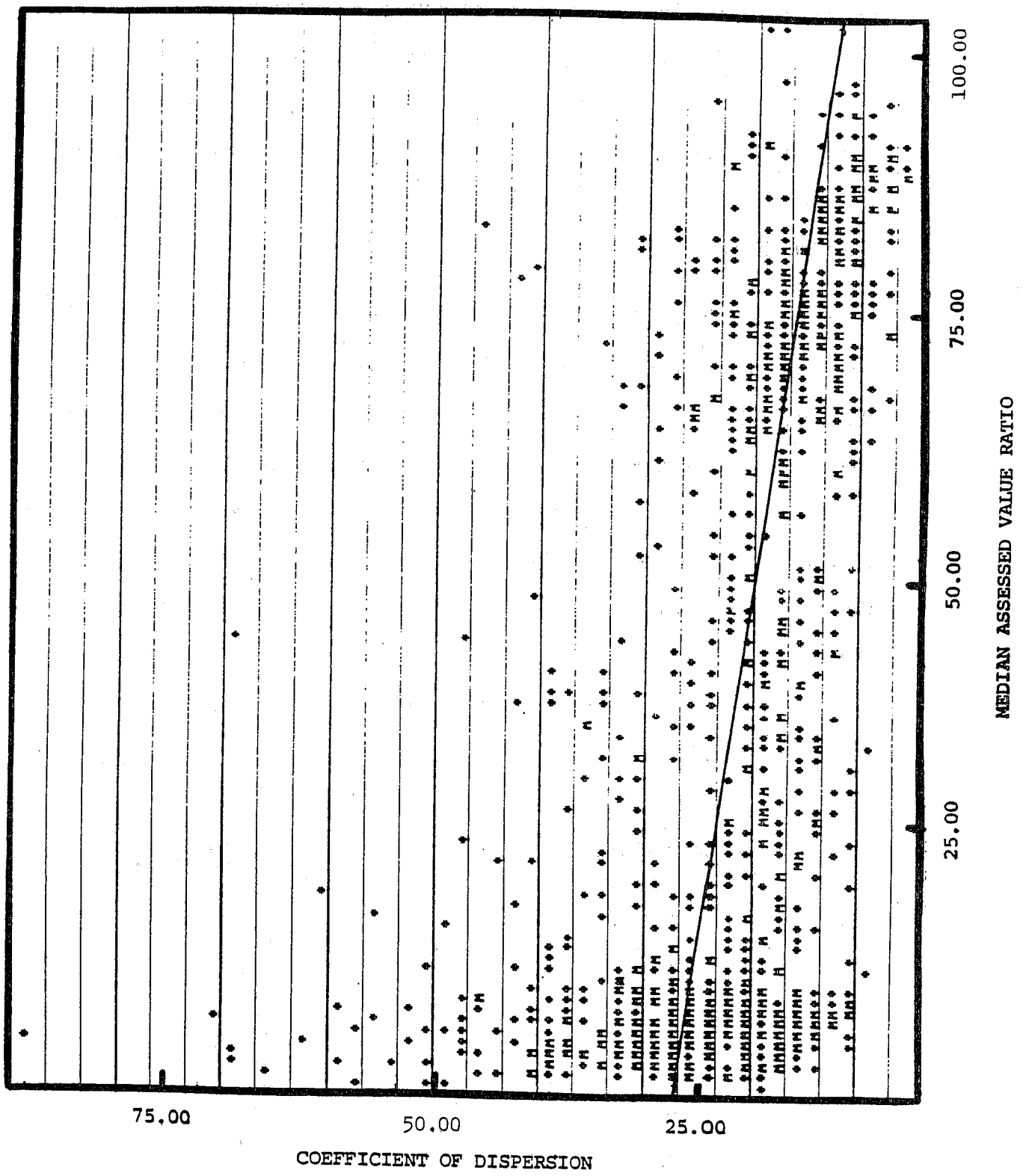
Figure 3 graphically demonstrates the relationship between the magnitude of residential CODs and median assessment ratios. It can be observed that, as the assessment ratio rises (approaches full value assessment), the estimated coefficient of dispersion generally declines. The data thus indicate that assessments are generally better in full value assessing units. Also shown is a sloped line representing an equation which estimates the COD as a function of the assessment ratio alone. This estimate is made through a statistical technique known as regression analysis. The equation represented by the line is:

Coefficient of Dispersion = 27.12 - .154 X (median AV ratio) (r^2 = 22%).

The most important aspect of this estimation equation is the negative slope of the line. The negative indicats that, as the assessment ratio rises, the COD declines, and vice versa. We can interpret the numbers in the equation to predict a coefficient of dispersion about one and a half percentage points lower for every ten percentage point increase in the observed assessed value level. For the median assessment ratios listed below, the equation predicts the indicated CODs. That is, this equation generates the expectation that assessing units will not meet or exceed the 10% standard of assessment uniformity until assessments reflect full market values.

Observed Median Assessed Value Ratio	Expected Coefficient of Dispersion
10%	25.58%
20%	24.04%
30%	22.50%
40%	20.96%
50%	19.42%
60%	17.88%
70%	16.34%
80%	14.80%
90%	13.26%
100%	11.72%
110%	10.18%
120%	8.64%

Figure 3. Prediction Equation for Coefficients of Dispersion when the Average Level of Assessing is Known, Residential Property.



All Property Coefficients of Dispersion

Expanding the scope of the study from residential property to all classes of property, we find substantially higher CODs. Less uniformity is thus evident when all property is considered. This is to be expected, since commercial, industrial, utility, and vacant land properties are more difficult to value than residential. In recognition of this difficulty, SBEA's COD standard for the property class is 15% — a standard which would allow a $100,000 property to have an average assessment error of plus or minus $15,000. Table 2 shows the extent to which the state's assessing units met or deviated from the standard as exemplified in the 1986 survey.

As can be seen in the table, a total of 94 assessing units meet the 15% criterion. A total of 73 of the 94 municipalities with exceptionally low assessment error for all property classes (78%) had median assessment ratios of 70% or higher. Only nine municipalities with median assessment ratios of 50% or less made the list. A recent revaluation of real property appears to be almost a prerequisite for an acceptable level of assessment uniformity across all categories of property.

Table 2. All Property Coefficients of Dispersion, 1986 Survey

Coefficient of Dispersion Range	Number of Municipalities	Percent
15% or Less	94	9.5%
15 to 25%	301	30.3%
25 to 35%	302	30.4%
35 to 45%	160	16.1%
45% or More	137	13.8%

Seventeen counties were noted in the 1986 survey results as having two or more municipalities with a 15% or lower average assessment error for all real property classes. The counties of Niagara and Genesee led with eleven and ten municipalities respectively. Chenango, Cortland, Livingston, Monroe, Rensselaer and Wayne Counties each contained six exceptional municipalities. Ontario, Orleans and Wyoming Counties had four and there were three each in Clinton, Tompkins and Steuben Counties. Finally, the counties of Cayuga, Rockland and St. Lawrence contained two such notable assessing units. Again, Niagara and Genesee Counties are clearly the leaders in achievement of uniform assessing and current information indicates that they have taken steps to maintain their quality assessment since the information for the 1986 survey was collected.

The least uniform assessments, when considering all property classes , are found in those cities and towns with coefficients of dispersion from 50% to well over 100%. There were 101 such municipalities. Seventy-two of these had median assessment ratios which were below 10%, indicating no committment to a full value standard. These results are not very heartening when one considers the significantly large number of municipalities involved and the importance of the taxation system which is based upon the faulty assessments they produce.

For the 994 assessing units, the median municipal-weighted all property assessment error was 28.6%. This is nine percentage points higher than the 19.6% error for residential property alone. The size of the discrepancy indicates the generally greater degree of inequity in the assessing of real property classes other than residential. Using a $100,000 property as an example once again, comparision of the residential and all property CODs indicates that the average mis-assessment in the state has a range of $80,400 to $119,600 for residences but reaches a range of about $71,400 to $128,600 for all property classes. When

municipalities' all property coefficients of dispersion are counted as often as the number of parcels each sample appraisal represents (parcel weighting), the median coefficient of dispersion increases to 30.4%. The spread between the 19.5% residential and 30.4% all property coefficients of dispersion, as weighted by the number of parcels, is about 11 percentage points -- once again reflecting the difficulty inherent in assessing nonresidential property.

Figures 4 and 5 show the distribution of New York State's assessing units in terms of all property coefficients of dispersion. Figure 4 shows a comparison of results from the 1980, 1983 and 1986 market value surveys. It indicates that the gain in the number of municipalities with 20% or lower coefficients of dispersion between the 1980 and 1983 surveys was almost entirely lost between the 1983 and 1986 surveys. This leaves a discouragingly large number of local governments (747 of 994) with average all property assessment errors of greater than 20%. However, there are recorded efforts by almost half of the state's local governments toward major assessment updating since the roll years used in the 1986 survey. This activity should produce some improvement in these statistics in future years.

Predicting assessment error for the 994 assessing units based on the average rate of market value at which each is assessing all classes of property (Figure 5) shows an even sharper slope than for residential property alone (Figure 3). The data distribution shows a noticeable relationship between the median assessment ratio for all property and the all property COD. The regression line originates from the following estimated equation and, once again, its negative slope means that the COD declines with increases in the median assessment ratio.

$$\text{Coefficient of Dispersion} = 41.65 - .288 \times (\text{median AV ratio}) \quad (r^2 = 19\%).$$

This result indicates that, for assessment practices which produce a median assessment ratio of 10%, we expect a coefficient of dispersion of about 39.7%. For every ten point increase in the average ratio of assessed value to market value, we expect the percent of error to drop by 2.9 points. The equation thus yields the following COD estimates:

Observed Median AV Ratio	Expected Coefficient of Dispersion
10%	39.70%
20%	35.60%
30%	33.01%
40%	30.13%
50%	27.25%
60%	24.37%
70%	21.48%
80%	18.60%
90%	15.73%
100%	12.85%
110%	9.97%
120%	7.09%

Once again, we find that the SBEA standard will not usually be met until full value assessment practices are in place. While the prediction equation suffers from considerable variation in the range of lower median assessed value ratios, it is once again highly predictive of better coefficient of dispersion results in the upper-value range: the municipalities assessing real property at ratios closer to full value are more likely to produce greater assessment uniformity among all classes of property.

Figure 4: Distribution of Coefficients of Dispersion, All Property Classes 1980, 1983, and 1986 Surveys

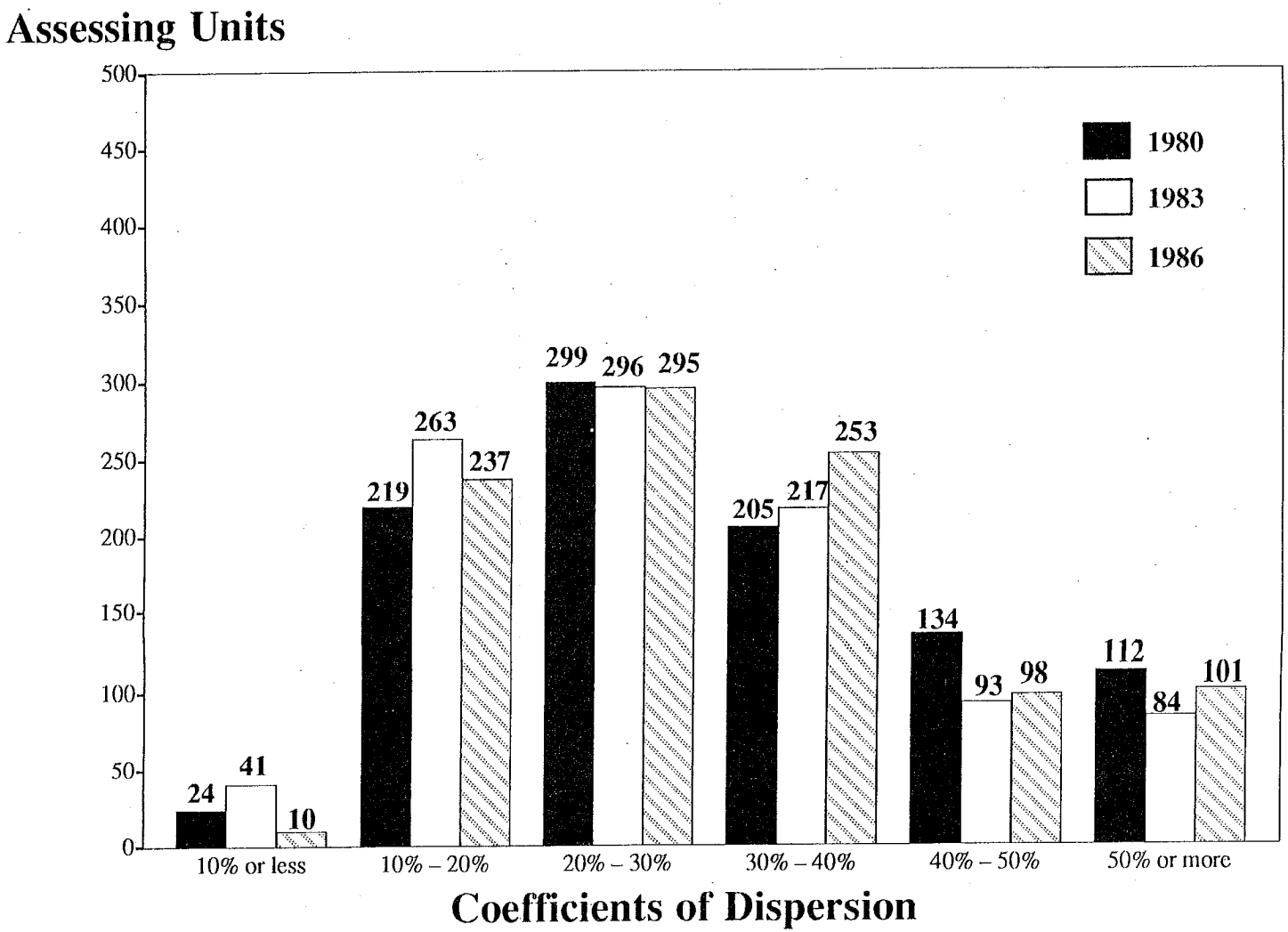


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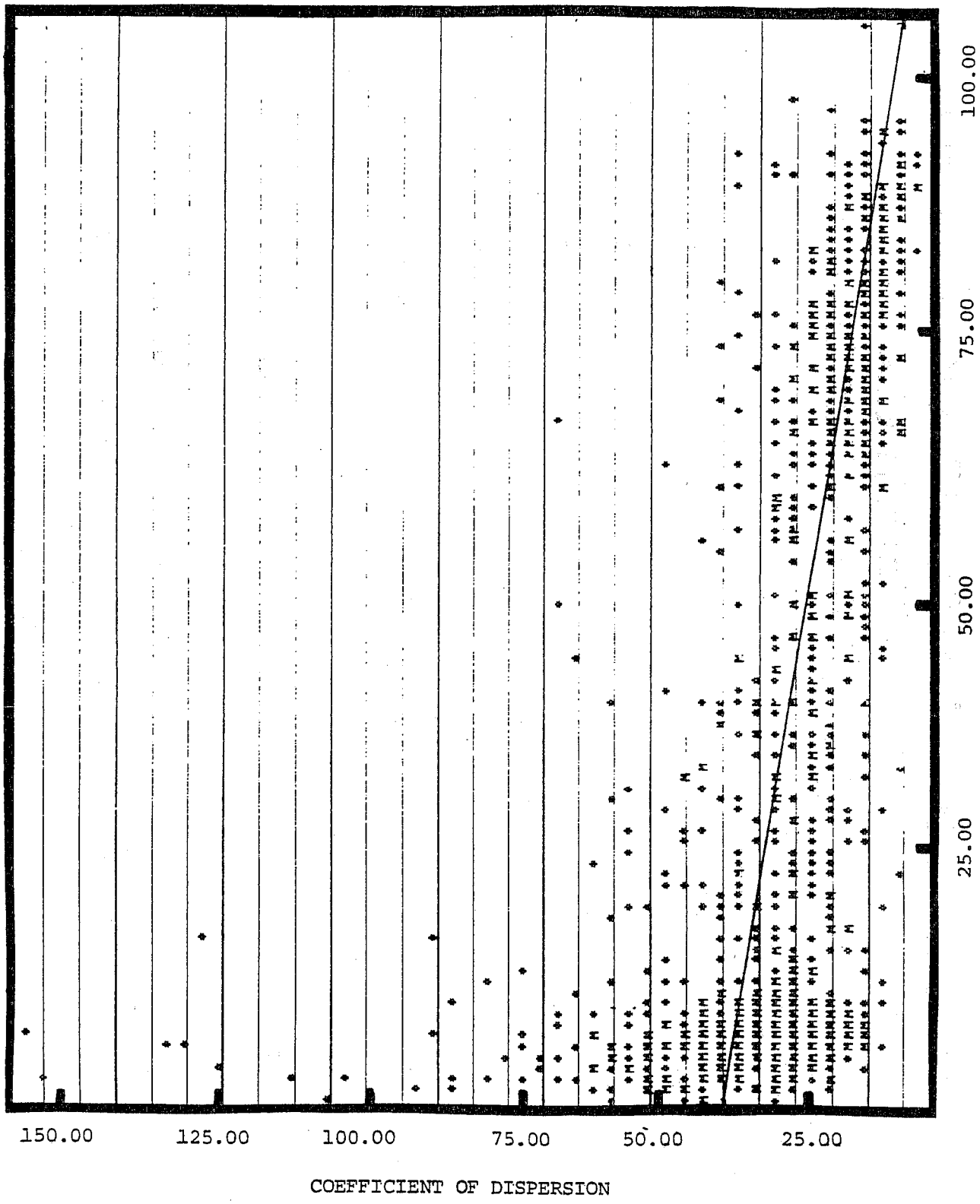
Figure 5. Prediction Equation for Coefficients of Dispersion when the Average Level of Assessing is Known, All Property Classes.



Continuity Between 1980, 1983 and 1986 Surveys: Market Value Ratios and Assessment Equity

This report uses the same methods of calculation and produces the same statistics on assessment uniformity as were used in SBEA's assessment equity reports based on the 1980 and 1983 market value surveys. It is useful to review the comparative performance of the assessing units over time, judging whether similar assessing practices produce similar measures of equity. For these three market value surveys, the composite measure of the level of assessing is the market value ratio. The market value ratio is the estimated average ratio of assessed value to market value on an assessment roll, based on a sample of ratios in that district (where each sampled property is counted according to the amount of assessed value it represents on the roll).

There were 993 assessing units measured in all three surveys. When the ratios were compared from each survey to the next, it was found that successive ratios were within plus or minus five percentage points of each other for 636 places between 1980 and 1983 and for 556 places between 1983 and 1986. Between 1980 and 1983, 108 places increased their level of assessing by more than five percentage points as did 68 assessing units between 1983 and 1986. The slippage evident from assessments not keeping pace with current realty markets resulted in 249 places dropping by more than five percentage points between 1980 and 1983. This trend increased between 1983 and 1986, as 369 places dropped by more than five percentage points.

Table 3 shows the 1980, 1983 and 1986 survey breakdown of the 993 market value ratios. For ease in depicting these movements in the assessment rolls, they have been placed into four categories:

1. Market value ratios of less than 10%,
2. ratios of 10 to 20%,
3. ratios of 20 to 70%, and
4. ratios of 70% or more.

Table 3. Range of Market Value Ratios for 993 Municipalities, Based on 1980, 1983 and 1986 Market Value Surveys.

Market Value Ratio	Market Value Survey		
	1980	1983	1986
10% or less	256	283	343
10 to 20%	255	203	125
20 to 70%	241	218	291
70% or more	241	289	234

In the 1980 survey, about one quarter of the assessing units fall into each category. The movement evident from 1980 to 1983 shows growing polarization: the assessing units having market value ratios between 10% and 70% drop from half to three out of seven; ratios below 10% are found in 27 more assessing units in 1983 and ratios above 70% are found in 48 additional units. Between 1983 and 1986, there is a decline (55 assessing units) among those with 70% or better market value ratios. Ratios below 10% are found in 60 more places. There are 78 fewer ratios between 10% and 20%, and 73 more in the range between 20% and 70%, evident in the 1983 survey results.

The same four categories can be used to compare the change which occurred between 1980 and 1983 to that occurring between 1983 and 1986. The results of this comparison appear in the following tables.

Table 4.A. Movement in Market Value Ratios, 993 Assessing Units, 1980-1983

1983 Market Value Ratios	1980 Market Value Ratios			
	10%/less	10 - 20%	20 - 70%	70%/more
10% or less	231	52	0	0
10 - 20%	8	173	22	0
20 - 70%	0	3	175	40
70% or more	17	27	44	201

Table 4.B. Movement in Market Value Ratios, 993 Assessing Units, 1983-1986

1986 Market Value Ratios	1983 Market Value Ratios			
	10%/less	10 - 20%	20 - 70%	70%/more
10% or less	262	81	0	0
10 - 20%	1	108	16	0
20 - 70%	4	4	181	102
70% or more	16	10	21	187

Tables 4.A and 4.B indicate the extent and nature of the shifting of individual municipalities' market value ratios. For instance, Table 4.B shows 16 places which had ratios of 10% or less according to the 1983 survey shifted to ratios of 70% or more as calculated during the 1986 survey. Ten other places jumped from ratios of between 10% and 20% to ratios over 70%. Another 21 places rose from the 20% to 70% range to ratios of over 70%. These increases most likely indicate revaluation activity in those particular municipalities over the period in question. Other places which dropped from higher market value ratio levels in the 1983 survey findings to lower brackets in the 1986 survey are probably exhibiting slippage from earlier revaluations. This is likely in the 102 places which were at 70% or more in 1983 but dropped to the 20% to 70% range in 1986. The 187 municipalities which were above 70% in both surveys are most probably those which revalue periodically to maintain accurate assessment rolls.

Since the market value ratio is an all-property measure — depicting the overall level of assessment on the roll as compared to the prevailing real property values — a comparison of this statistic to assessment uniformity measures can best be accomplished using the coefficient of dispersion for all properties. This comparison, for the 1980, 1983 and 1986 surveys, is presented below in Tables 5.A, 5.B and 5.C. The measures of assessment error are broken

into intervals of 15%, where the first category representing the lowest COD's (0% to 15%) meets the State Board's standard for acceptable dispersion. Between the 1980 and 1983 surveys, an additional 21 assessing units (from 129 to 150) met this standard — a slight improvement. However, between the 1983 and 1986 surveys, the number of places meeting the State Board's standard dropped to 94 from 150. Those places in the next category, with dispersion measures between 15% and 30%, increased from 413 to 449 between 1980 and 1983, and remained at approximately the same level in 1986 (447 places). The most unequal assessment rolls, showing coefficients of dispersion which are greater than 60%, number about the same in both surveys: 45 places in the 1980 study, 42 in the survey conducted for 1983, and 47 in the 1986 survey.

Once again, these tables show the relationship between quality, equitable assessment practices and higher assessment levels. In 1980, 108 of the 129 assessing units achieving CODs below the State Board's standard of 15% error or less had a 70% level of assessment or better, while only 21 of them had assessment levels below 70% of market value. Three years later, we still find 136 of the 150 units achieving the 15% standard were assessing at 70% of market value or better, whereas only 14 places showing a level of assessment below 70% of value achieved this standard. In the 1986 survey findings, the pattern continues, with 75 of the 94 assessing units achieving the SBEA's standard at or above a 70% market value ratio and the remaining 19 below 70%. For those assessing units showing lower market value ratios, the tendency is to have greater assessment error, evidenced by the larger number of high all property coefficients of dispersion.

Table 5.A 1980 Coefficients of Dispersion and Assessment Level, All Property

1980 All Property Coefficients of Dispersion	1980 Market Value Ratios			
	10%/less	10 - 20%	20 - 70%	70%/more
15% or less	1	8	12	108
15 - 30%	61	100	131	121
30 - 45%	96	96	78	10
45% or more	98	51	20	2

Table 5.B 1983 Coefficients of Dispersion and Assessment Level, All Property

1983 All Property Coefficients of Dispersion	1983 Market Value Ratios			
	10%/less	10 - 20%	20 - 70%	70%/more
15% or less	0	4	10	136
15 - 30%	87	90	140	132
30 - 45%	129	78	50	16
40% or more	67	31	18	5

Table 5.C 1986 Coefficients of Dispersion and Assessment Level, All Property

1986 All Property Coefficients of Dispersion	1986 Market Value Ratios			
	10%/less	10 - 20%	20 - 70%	70%/more
15% or less	1	3	15	75
15 - 30%	101	42	165	139
30 - 45%	154	54	88	19
45% or more	87	26	23	1

Figure 6 shows the direction of change for the 993 municipalities' assessing practices between the 1980 and 1983 and between the 1983 and 1986. About half of the municipalities' levels of residential assessment error stayed essentially the same over the entire period (within five percentage points of their earlier levels of mis-assessment). Between the 1980 and 1983 surveys, 320 municipalities improved their residential practices. Most of these (239) had a coefficient of dispersion between 5 and 15 percentage points lower than previously. The remaining 21%, 213 places, showed residential assessing practices to be deteriorating (higher coefficients of dispersion) between 1980 and 1983. Somewhat fewer (207) places showed improved residential coefficients of dispersion between the 1983 and 1986 surveys and the remaining 208 had worse residential assessment error between these two years, with most of their CODs declining between 5 and 15 percentage points.

Figure 7 shows that when all property classes are combined, thirty eight percent kept their former level of mis-assessment(378 between 1980 and 1983; 376 between 1983 and 1986). Almost the same number, 374 municipalities, improved their all property assessing practices by at least five percentage points between the 1980 and 1983 surveys. The remaining 241 assessing units (24%) had all property coefficients of dispersion at least five percentage points lower than before, showing less uniformity of assessment in 1983 than in 1980. Between the 1983 and 1986 results, there was a greater decline in assessment equity for all property classes in 378 places, while only 240 improved.

Figure 6: Changes in Coefficients of Dispersion, Residential Property Only 1980 to 1983 and 1983 to 1986 Surveys

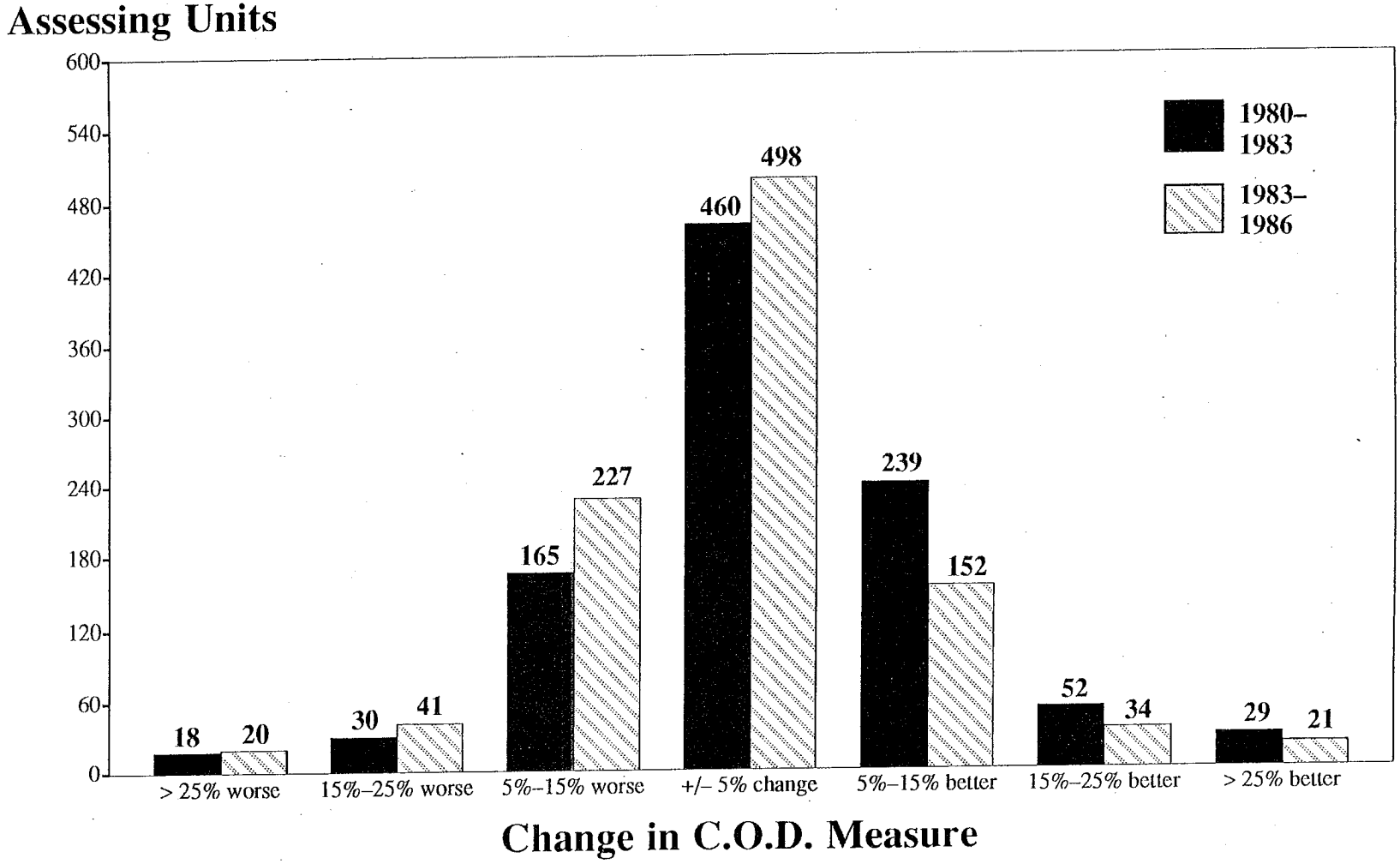


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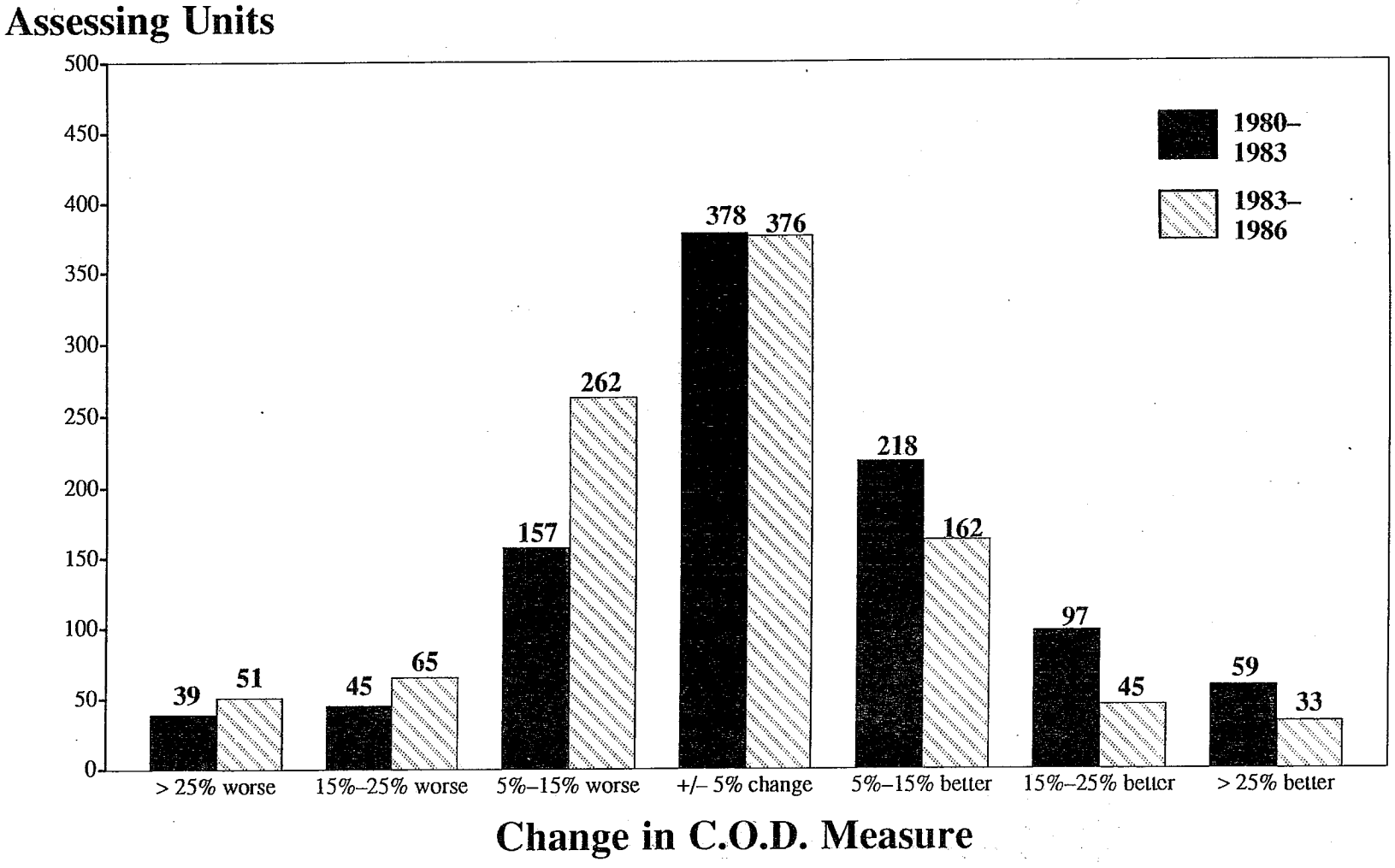
Figure 7: Changes in Coefficients of Dispersion, All Property Classes 1980 to 1983 and 1983 to 1986 Surveys



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Tables 6.A and 6.B relate each municipality's change in residential assessment error to its change in market value ratio between the 1983 and 1986 surveys. Tables 7.A and 7.B do the same for all property assessment error. The data in the tables are divided into two groups: assessing units at or near full value (i.e., a market value ratio of 70% or better) and those without full value assessment practices (market value ratio of 70% or less). Forty-six municipalities showed a substantial increase in their level of assessment between the two surveys, with their market value ratios rising by at least 30 percentage points — a sign of their effort to keep assessments current. Thirty-three of these 46 places could boast a lower residential assessment error for their efforts and 35 had a lower all property assessment error. Their coefficients of dispersion dropped by at least five percentage points.

The findings from this review of assessment performance over time are straightforward and clear: lower assessment levels coincide with roll inequality, higher levels of assessment generally occur in tandem with more equity and less assessment dispersion. This was true between the 1980 and 1983 surveys, and it was still true when the assessment rolls were measured against realty markets in 1986.

The preponderance of municipalites in New York State cannot be considered at or near full value assessment levels, with 759 out of 993 municipalities assessing real property below a 70% level of market value. This is an indication that there is still much room for improvement in assessing practices in the state.

Table 6.A Change in Residential Coefficient of Dispersion by Change in Level of Assessment: 1986 Market Value Ratios Less than 70%

Change in Coefficient of Dispersion	Change in Market Value Ratio Between 1983 and 1986 Survey: Less than 30% Change	Change in Market Value Ratio Between 1983 and 1986 Survey: Greater than 30% Change
More than 25% Improved	19	0
15 - 25% Improved	28	0
5 - 15% Improved	110	3
± 5% of 1983	367	1
5 - 15% Worse	173	1
15 - 25% Worse	38	0
More than 25% Worse	19	0
Totals	**754**	**5**

Table 6.B Change in Residential Coefficient of Dispersion by Change in Level of Assessment: 1986 Market Value Ratios Greater than 70%

Change in Coefficient of Dispersion	Change in Market Value Ratio Between 1983 and 1986 Survey: Less than 30% Change	Change in Market Value Ratio Between 1983 and 1986 Survey: Greater than 30% Change
More than 25% Improved	0	2
15 - 25% Improved	2	4
5 - 15% Improved	15	24
± 5% of 1983	121	9
5 - 15% Worse	51	2
15 - 25% Worse	3	0
More than 25% Worse	1	0
Totals	**193**	**41**

Table 7.A Change in All Property Coefficient of Dispersion by Change in Level of Assessment: 1986 Market Value Ratios Less than 70%

Change in Coefficient of Dispersion	Change in Market Value Ratio Between 1983 and 1986 Survey: Less than 30% Change	Change in Market Value Ratio Between 1983 and 1986 Survey: Greater than 30% Change
More than 25% Improved	26	2
15 - 25% Improved	35	0
5 - 15% Improved	120	1
± 5% of 1983	268	1
5 - 15% Worse	198	0
15 - 25% Worse	57	0
More than 25% Worse	50	1
Totals	**754**	**5**

Table 7.B Change in All Property Coefficient of Dispersion by Change in Level of Assessment: 1986 Market Value Ratios Greater than 70%

Change in Coefficient of Dispersion	Change in Market Value Ratio Between 1983 and 1986 Survey: Less than 30% Change	Change in Market Value Ratio Between 1983 and 1986 Survey: Greater than 30% Change
More than 25% Improved	0	5
15 - 25% Improved	1	9
5 - 15% Improved	23	18
± 5% of 1983	98	8
5 - 15% Worse	63	1
15 - 25% Worse	8	0
More than 25% Worse	0	0
Totals	**193**	**41**

Table 8 summarizes the cities and towns which showed acceptable assessing practices in results taken from the 1980, 1983 and 1986 market value surveys.

Table 8. Number of Municipalities with Acceptably Low Coefficients of Dispersion*: 1980, 1983 and 1986 Surveys.

	Number of Municipalities		
Survey Year	**Residential**	**All Property**	**Both**
1980	118	129	91
1983	128	150	87
1986	72	94	51

*Acceptable coefficients of dispersion according to SBEA standards are 10% or less for residential property and 15% or less for all property classes combined.

There were 56 fewer municipalities with 10% or lower average error in residential assessments in 1986 than in 1983. The 1986 survey also showed a decline of 56 places (150 to 94) in which the all property COD was at or below 15%. Only 51 municipalities met the State Board's standards for assessment equity in both the residential and all property classes --a decline of about 40% between the 1983 and 1986 surveys. However, the high amount of scheduled or completed revaluation activity since the 1986 survey data year should show results in subsequent studies of this type. The counties having heavy revaluation activity since their 1986 survey base year rolls include Clinton, Dutchess, Erie, Essex, Fulton, Genessee, Hamilton, Jefferson, Livingston, Madison, Niagara, Orange, Orleans, Oswego, Rockland, St. Lawrence, Saratoga, Sullivan and Wayne Counties. In addition, many individual municipalities in other counties are in the process of updating their assessments. The cities and towns having revaluation

activity or plans known by SDEA have been listed in Appendix A (Table A1). Also listed in Appendix A (Table A2) are municipalities with a 15% or greater change in their level of assessment in any single year subsequent to the 1986 survey. Such a change may evidence local revaluation activity conducted without SDEA assistance or knowledge.

Index of Regressivity

Another summary statistic of assessment performance is the "index of regressivity." This is a measure of vertical assessment bias, where a value of 1.00 indicates that the level of assessment error is basically the same over all property value levels. The value of the index will be higher than 1.00 when higher-valued properties are systematically assessed at a lower percentage of value (i.e., "regressive" assessment practices). Conversely, an index lower than 1.00 will occur when lower-valued properties are systematically assessed at a lower percentage of value (i.e., "progressive" assessment practices). A generally accepted practice in measuring regressivity and progressivity is to designate acceptable levels as those having an index value between .95 and 1.10.

The index of regressivity is calculated by dividing the mean assessment ratio by the weighted mean, where the weighted mean is the sum of assessed values over the sum of appraised values. The mean counts the ratio of each property equally regardless of the property's value. The weighted mean counts each ratio differently, weighing ratios of higher valued properties more heavily, in proportion their dollar value. If no assessment bias exists, the two values should be equal, producing an index of 1.00. If a bias occurs in favor of under-assessing the higher-valued properties, this will appear as an index above 1.00 (regressivity); if a bias in favor of over-assessing the higher-valued properties

occurs, this will produce an index below 1.00 (progressivity). Values within the acceptable .95 to 1.10 (neutral) range are inconclusive indicators of bias since they may reflect a few outliers rather than a definite trend.

Table 9 presents an overview of the assessing units and counties which revealed progressive, regressive, and neutral practices based on 1986 survey information.

Table 9. Vertical Assessment Equity by County and by Assessing Unit, 1986 Survey

	Number of Counties/Assessing Units Exhibiting Vertical Equity					
	Progressive		Neutral		Regressive	
Property Type	Counties	Assessing Units	Counties	Assessing Units	Counties	Assessing Units
Residential	0	20	57	842	1	132
All Property	30	449	27	411	1	134

For residential property only, 842 out of 994 assessing units fall within the range of 0.95 to 1.10, exhibiting no bias. One hundred thirty-two places show regressive residential assessment practices, with an index of regressivity between 1.11 and 1.70, showing a tendency to over-assess lower valued residences. Twenty assessing units fall below the 0.95 cut off, indicating a bias toward over-assessing highly valued residences.

When we expand the consideration to all property classes, however, we begin to find a much stronger tendency toward overassessing more valuable real property: a large number of assessing units exhibit progressive assessment practices. Four hundred forty nine cities and towns (45%) fit this description, with indexes below .95. In 134 cities and towns, we find regressive

assessment practices for all classes of real property, where lower valued properties are more systematically assessed at a higher than average percent of their market value. The remaining 411 assessing units have neutral assessment practices, meeting the standard of "vertical equity" for all property classes.

Summary

In SBEA's initial study on the quality of assessing in New York State ("Residential Taxpayer Equity: New York State Assessing Practices in 1978", October 1981) coefficients of dispersion were calculated for residential properties only, based on the 1978 market value survey. Upon completion of a subsequent study based on 1980 data (December 1984) some improvement was noted in the quality of residential assessment practices in the State between the 1978 and 1980 survey results. The statewide median municipal coefficient of 22.54%, based on the 1978 survey, had fallen to 19.99% for the 807 assessing units reported in the 1980 survey publication — an overall average improvement of 2.55 percentage points. The next SBEA study (February 1988), based on 1983 survey data, showed an additional improvement — a continuation of the previous trend. The 1983 survey statewide median residential COD was 18.26% for 756 assessing units, a 1.73 percentage point improvement over the 1980 survey median.

However, the 1986 survey results, discussed throughout the present report and summarized on a statewide basis in Table 10, clearly show that this pattern of improvement has been reversed. The 1986 survey's statewide median municipal-weighted coefficient for residential property was 19.60%, based on 994 cities and towns, indicating an overall decline in quality of 1.34 percentage points. Only 65 assessing units met the 10% SBEA standard for residential

assessments in 1978, whereas 118 had met this standard in 1980. In the 1983 survey, 128 municipalities out of 994 were within the State standard, but the number declined to 72 out of the 994 for the 1986 survey. Whereas the statewide median all property coefficient of dispersion declined slightly (from 27.96% to 27.37%) between the 1980 and 1983 survey studies, it increased to 28.60% in the 1986 survey.

Table 10. Summary of Statewide CODs: 1986 Survey

Property Type	SBEA Standard	Statewide Average: Municipal Weighting (1)	Statewide Average: Parcel Weighting (2)
Residential Only	10.0%	19.6%	19.5%
All Property	15.0%	28.6%	30.4%

(1) Statewide median COD (between the 497th and 498th of 994 assessing units).

(2) Statewide median COD weighted by number of parcels per assessing unit.

When the municipalities' residential coefficients of dispersion are weighted according to the number of parcels each sample appraisal represents, the 1986 survey's average statewide coefficient of 19.5% is very similar to the same statistic computed with all municipalities having equal weights (19.6%). Larger and smaller assessing units thus show no distinguishable difference in their treatment of residential properties.

The higher all property measure of error (30.4% with parcel weighting vs. 28.6% with municipal weighting) indicates that the largest municipalities are treating classes of property other than residential more inequitably than their smaller neighbors. Again, the roughly ten percentage point difference between the statewide residential and all property class error measures (19.6% versus

28.6% and 19.5% versus 30.4%) point out the greater difficulty and inequity in assessing property classes other than residential.

As indicated in the text, substantial room remains for improvement in assessing practices. We have found, once again, that the quality of assessment practices is likely to go up with full value assessments. Greater equity comes from having every parcel assessed at the same (uniform) percentage of value, and that equity is more readily apparent when the percentage used is closer to 100%. The decline in assessment uniformity between the 1983 and 1986 surveys is especially troubling — as it represents a reversal of earlier trends. It is hoped that the large amount of reassessment activity currently underway in the state will serve to reverse the observed decline.

APPENDIX A

Table A1. Municipalities Reported by SBEA to have Planned or Completed Revaluations Since 1986 Survey Base Year Assessment Roll.

Albany County
- Guilderland
- Knox

Allegany County
- Andover
- Bolivar
- Friendship
- Grove
- Ward
- Wellsville
- West Almond
- Willing

Cattaraugus County
- Ashford
- Ellicottville
- Little Valley
- Lyndon
- Otto

Cayuga County
- Auburn (C)
- Brutus
- Cato
- Fleming
- Owasco
- Scipio
- Springport
- Sterling

Chautauqua County
- Arkwright
- Busti
- Charlotte
- Chautauqua
- Ellery
- Ellington
- Harmony
- North Harmony
- Poland
- Portland
- Stockton

Chemung County
- Elmira
- Southport
- Van Etten

Chenango County
- Norwich (C)
- Oxford

Clinton County
- Plattsburgh (C)
- Altona
- Ausable
- Beekmantown
- Black Brook
- Champlain
- Chazy
- Clinton
- Dannemora
- Ellenburg
- Mooers
- Peru
- Plattsburgh
- Saranac
- Schuyler Falls

Cortland County
- Cortlandville
- Cuyler
- Preble
- Solon
- Virgil

Delaware County
- Middletown

Dutchess County
- Beacon (C)
- Amenia
- Beekman
- Clinton
- Dover
- Fishkill
- Hyde Park
- La Grange
- Milan
- Northeast
- Pawling
- Pine Plains
- Pleasant Valley
- Poughkeepsie
- Red Hook
- Rhinebeck
- Stanford
- Union Vale
- Wappinger

Erie County
- Buffalo (C)
- Lackawana (C)
- Tonawanda (C)
- Alden
- Amherst
- Aurora
- Boston
- Brant
- Cheektowaga
- Clarence
- Colden
- Collins
- Concord
- Eden
- Evans
- Grand Island
- Hamburg
- Holland
- Lancaster
- Marilla
- Newstead
- North Collins
- Orchard Park
- Sardinia
- Tonawanda
- Wales
- West Seneca

Essex County
- Chesterfield
- Crown Point
- Elizabethtown
- Essex
- Jay
- Keene
- Lewis
- Minerva
- Moriah
- Newcomb
- North Elba
- North Hudson
- St. Armand
- Schroon
- Ticonderoga
- Westport
- Willsboro
- Wilmington

Table A1. Municipalities Reported by SBEA to have Planned or Completed Revaluations Since 1986 Survey Base Year Assessment Roll (continued).

Franklin County
- Bellmont
- Brandon
- Brighton
- Duane
- Franklin
- Harrietstown
- Malone

Fulton County
- Gloversville (C)
- Johnstown (C)
- Bleecker
- Broadalbin
- Caroga
- Ephratah
- Johnstown
- Mayfield
- Northampton
- Oppenheim
- Perth
- Stratford

Genesee County
- Batavia (C)
- Alabama
- Alexander
- Batavia
- Bergen
- Bethany
- Byron
- Darien
- Elba
- Le Roy
- Oakfield
- Pavilion
- Pembroke
- Stafford

Greene County
- Cairo
- Catskill
- Hunter
- Jewett
- Lexington
- Prattsville
- Windham

Hamilton County
- Arietta
- Benson
- Hope
- Indian Lake
- Inlet
- Lake Pleasant
- Long Lake
- Morehouse
- Wells

Jefferson County
- Watertown (C)
- Adams
- Alexandria
- Antwerp
- Brownville
- Cape Vincent
- Champion
- Clayton
- Ellisburg
- Henderson
- Hounsfield
- Le Ray
- Lorraine
- Orleans
- Pamelia
- Rodman
- Rutland
- Theresa
- Watertown
- Wilna

Livingston County
- Avon
- Caledonia
- Conesus
- Geneseo
- Groveland
- Leicester
- Lima
- Livonia
- Mount Morris
- North Dansville
- Nunda
- Ossian
- Portage

Livingston Co. (cont.)
- Sparta
- Springwater
- West Sparta
- York

Madison County
- Oneida (C)
- Brookfield
- Cazenovia
- De Ruyter
- Eaton
- Fenner
- Georgetown
- Hamilton
- Lebanon
- Lenox
- Lincoln
- Madison
- Nelson
- Smithfield
- Stockbridge
- Sullivan

Monroe County
- Rochester (C)
- Chili
- Mendon
- Pittsford
- Riga
- Rush
- Webster
- Wheatland

Montgomery County
- Florida
- Mohawk

Nassau County
- Long Beach (C)

Niagara County
- Lockport (C)
- Niagara Falls (C)
- N. Tonawanda (C)
- Cambria
- Hartland
- Lockport

Table A1. Municipalities Reported by SBEA to have Planned or Completed Revaluations Since 1986 Survey Base Year Assessment Roll (continued).

Niagara County (cont.)
- Newfane
- Pendleton
- Porter
- Royalton
- Somerset
- Wheatfield
- Wilson

Oneida County
- Annsville
- Augusta
- Boonville
- Bridgewater
- Forestport
- Marshall
- Paris
- Sangerfield
- Trenton
- Vernon
- Western

Onondaga County
- Elbridge
- Lysander
- Manlius
- Pompey
- Tully
- Van Buren

Ontario County
- Canandaigua (C)
- Geneva (C)
- Geneva

Orange County
- Middletown (C)
- Newburgh (C)
- Port Jervis (C)
- Chester
- Cornwall
- Crawford
- Deerpark
- Greenville
- Hamptonburgh
- Highlands
- Minisink
- Montgomery

Orange County (cont.)
- Mount Hope
- Newburgh
- Woodbury

Orleans County
- Albion
- Barre
- Carlton
- Claredon
- Gaines
- Kendall
- Murray
- Ridgeway
- Shelby
- Yates

Oswego County
- Constantia
- Granby
- Hannibal
- Hastings
- Minetta
- Oswego
- Palermo
- Richland
- Schroeppel
- Williamstown

Rensselaer County
- Nassau
- Petersburg
- Schaghticoke

Rockland County
- Clarkstown
- Orangetown
- Ramapo
- Stony Point

St. Lawrence County
- Odgensburg (C)
- Canton
- Clifton
- De Peyster
- Edwards
- Fine
- Gouverneur

St. Lawrence Co. (cont.)
- Hammond
- Lawrence
- Louisville
- Morristown
- Norfolk
- Oswegatchie
- Parishville
- Potsdam
- Rossie
- Russell
- Stockholm
- Waddington

Saratoga County
- Ballston
- Day
- Malta
- Milton
- Northumberland
- Saratoga
- Stillwater
- Wilton

Schenectady County
- Duanesburg
- Glenville
- Niskayuna

Schuyler County
- Hector

Seneca County
- Covert
- Lodi
- Ovid
- Romulus

Steuben County
- Corning (C)
- Avoca
- Bath
- Canisteo
- Corning
- Dansville
- Hartsville
- Hornby
- Hornellsville

Table A1. Municipalities Reported by SBEA to have Planned or Completed Revaluations Since 1986 Survey Base Year Assessment Roll (continued).

Steuben County (cont.)
- Howard
- Pultney
- Wayland

Sullivan County
- Bethel
- Callicoon
- Delaware
- Fremont
- Highland
- Liberty
- Lumberland
- Rockland
- Tusten

Tompkins County
- Ithaca (C)
- Caroline
- Danby
- Dryden
- Enfield
- Groton
- Ithaca
- Lansing
- Newfield
- Ulysses

Ulster County
- Kingston (C)
- Gardiner
- Hardenburgh
- Marlborough
- New Paltz
- Rosendale
- Ulster
- Woodstock

Warren County
- Bolton
- Lake George
- Chester
- Lake Luzerne
- Queensbury
- Warrensburg

Wayne County
- Arcadia
- Galen
- Huron
- Lyons
- Macedon
- Marion
- Rose
- Sodus
- Walworth
- Williamson
- Wolcott

Westchester County
- New Castle

Wyoming County
- Arcade
- Attica
- Bennington
- Castile
- Gainesville
- Java
- Perry
- Pike

Yates County
- Middlesex

Table A2. Municipalities with a Substantial Change in their Level of Assessment (15% or Greater in One Year) Since 1986 Survey But No SBEA-Reported Revaluation.

Allegany County
- Alfred
- Almond
- Belfast

Broome County
- Colesville

Cattaraugus County
- Conewango
- Portville
- Randolph
- Yorkshire

Chautauqua County
- Ellicott

Chenango County
- Columbus
- Greene
- Lincklaen
- North Norwich
- Plymouth

Columbia County
- Hillsdale

Delaware County
- Tompkins

Greene County
- Ashland

Herkimer County
- Schuyler
- Webb

Jefferson County
- Lyme
- Philadelphia

Lewis County
- Harrisburg
- Pinckney

Ontario County
- Bristol
- Canadice
- Canandaigua
- East Broomfield
- Farmington
- Gorham
- Hopewell
- Manchester
- Naples
- Richmond
- South Bristol
- Victor
- West Bloomfield

Otsego County
- Otsego

St. Lawrence County
- Clare

Schoharie County
- Esperance
- Schoharie
- Wright

Schuyler County
- Tyrone

Sullivan County
- Cochecton
- Mamakating

Tioga County
- Tioga

Warren County
- Thurman

Washington County
- Fort Edward
- Greenwich
- Hebron
- Jackson
- Kingsbury
- Putnam

Wayne County
- Ontario

Yates County
- Barrington
- Italy
- Jerusalem
- Milo
- Torrey

APPENDIX B:

COEFFICIENT OF DISPERSION COMPUTATION FORMULA AS USED IN THIS REPORT

The coefficients of dispersion contained in this report are calculated from the estimates of market value (appraisals) derived in the New York State Board of Equalization and Assessment's 1986 market value survey. The coefficients are "weighted" according to the selection procedures employed by the SBEA in choosing the properties to be included in the survey: a stratified random sample.

When the SBEA selects a sample of properties to include in a survey, preliminary sorts are made of each assessment roll so as to segregate properties into classes. Each broad use class from an assessment roll can be viewed as a list of the properties contained within that property class. These lists are further subdivided into a number of assessed value intervals and, where appropriate, into political subdivisions such as villages within towns. Each of these political or assessed value subdivisions of the overall list of residential properties is a stratum, and the strata contain unequal numbers of properties. Random sampling from each stratum will produce examples of the assessment practices found, with the sampled assessment ratios (assessed value divided by appraised value) "representing" different numbers of parcels. Because of the differences in the representativeness of each sampled parcel, weights are attached to each assessment ratio so as to distribute the "representativeness" uniformly over the entire property class.

The general formula for a coefficient of dispersion around the median is:

$$(1.) \qquad \tilde{COD} = \frac{100}{R_m} \left[\frac{\Sigma i \, / R_i - R_m /}{n - 1} \right]$$

where:

$\tilde{COD}$ = coefficient of dispersion around the median;

R_m = median assessment ratio;

R_i = observed assessment ratio (one for each sampled property); and

n = number of properties sampled.

This general formula is usually applied to sales, where the representativeness of each sale is unknown (assumed to be randomly distributed across the population of properties). When the representativeness of each sampled parcel is known, we can correct the formula by weighting each of the observed assessment ratios as follows:

Let $w_i = p_i / s_i$, where:

w_i = the weight of every sample drawn from the i^{th} stratum;

p_i = the number of parcels in the i^{th} stratum;

s_i = the number sampled in the i^{th} stratum; and

$\overline{w}$ = the sum of the parcels divided by the sum of the samples in all strata.

This weight is calculated for each stratum, and is identical for all sampled parcels within it. For example, in a municipality, if there are 600 residential parcels in the assessed value range of $40,000 to $80,000 and six of them are selected in a random sample, then each one of the 6 sample ratios is assumed to represent 100 of the parcels in that range (or strata). With i signifying the count of strata, let j be the number sampled within a given stratum. An assessment ratio for a given observation will be R_{ij}. As in the case of formula (1.), above, we must calculate the absolute difference between R_{ij} and R_m, correcting the weight assigned to each observation by dividing by the mean weight, $\overline{w}$. For all j observations within each of the i strata, the formula for the weighted coefficient of dispersion around the median becomes:

$$(2.) \qquad \tilde{COD}_w = \frac{100}{R_m} \left[\frac{\Sigma_i \Sigma_j \frac{w_i}{\bar{w}} / R_{ij} - R_m /}{n - 1} \right]$$

The procedure for calculating the weighted coefficient for each assessing unit entails:

1. Calculate the assessment ratio (R_{ij}) for each sample parcel by dividing the assessed value by the appraisal value.

2. Array the assessment ratios from lowest to highest within each assessing unit.

3. Calculate the weight (w_i) for each sampled parcel and the average weight ($\bar{w}$) for the assessing unit.

4. Normalize the weight of each sampled parcel by dividing by $\bar{w}$.

5. Select the median assessment ratio (R_m) from the weighted list (length of list equals the total number of parcels sampled).

6. Apply the computing formula (2., above).

It is important to note that the median assessment ratio will not necessarily be the same as the median of the sampled ratios (e.g., the median from step 5 above, will not necessarily produce the same result as selecting the median from step 2). Instead, the median from the "weighted" list of appraisals is used, where the sum of the weights will equal the number sampled.

For cases where the stratification process is embedded even further, such as multiple portions within an assessing unit, the calculations embodied in the computing formula entail additional subscripts. However, the general form of the equation remains the same. In this manner we can statistically correct, to some degree, the deficiencies built into the sampling procedures and construct a measure built upon equally-likely selections of each parcel from an assessing unit.

In general, the calculation of coefficients of dispersion by means of this procedure will produce lower coefficients than a sales-based calculation. This is due to the problems listed in the text concerning sales reporting in New York. Sales will generally produce a greater amount of dispersion around the median value due to the increased probability of including disparate assessment ratios from the assessment roll. In a comparison of techniques using sales and survey results ("Sales Versus Appraisals: Measuring the Quality of Assessment in New York State," presented to the International Association of Assessing Officers annual meeting, Hollywood, Florida, October 1984), the sales-based coefficients of dispersion, with larger numbers of assessment ratios, produced generally higher coefficient of dispersions. If, by chance, the properties selected by the SBEA sampling procedures are more diverse than the assessment roll as a whole, the coefficient of dispersions calculated as in this report will have higher values than warranted. In general, however, the values listed in the report are conservative estimates of the overall dispersion to be found on the assessment rolls.

Some states have produced coefficients of dispersion from an even more conservative formula, using interquartile deviations as the basis for the calculations. This method is more appropriate as an estimate of the dispersion when the distribution of assessment ratios contain values not indicative of assessment practices (e.g., using sales files where sales do not reflect actual value, as in sales between relatives). The interquartile deviation method discards the values obtained in the lowest and highest fourths of the list of ratios, thereby producing lower estimates of dispersion than when each deviation from the measure of central tendency is calculated. Since the SBEA survey does not contain these "untrustworthy" data, all deviations from the median are included in the calculating formula.